

APGARS

PLANT ANALYSIS







N.H.S. 1882

Charles A Stone Newton Mars



APGAR'S

PLANT ANALYSIS;

ADAPTED TO GRAY'S BOTANIES.

BY E. A. AND A. C. APGAR.

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PREFACE.

STUDENTS in botany should be taught and required to write out brief descriptions of the plants they examine. This is important for the following reasons:

1st. Pupils will thus become familiar with the meaning of botanical terms;

2d. They will learn how to apply these terms in botanical descriptions;

3d. They will distinguish those characteristic features of a plant which are necessary to be known in making the analysis.

4th. The written exercises will afford the teacher an evidence of the work done by the pupils.

The use of the blank schedules, which this book furnishes, will secure a systematic description of the plants analyzed.

The "Analytical Arrangement of Botanical Terms" will be found valuable to the pupil in recalling to mind the terms used in the description of any particular part of a plant.

In order to economize space pupils should abbreviate their descriptions as much as possible.

NOTE -The signs for feet (°), inches ('), and twelfths (''), should be used in giving dimensions, and the signs for staminate (\$) and pistilate (\$) in the description of imperfect flowers.



ANALYTICAL ARRANGEMENT

OF

BOTANICAL TERMS.

D: fusiform,

ROOTS.

Kinds. - (1.) PRIMARY, growing from root-end of embryo.

(a.) SIMPLE. - Conicul, ; natiform,

(b.) MULTIPLE. — Moniliform, Precklace-like. Fascicu-

lated, Tubercular, thick and fleshy. Tubercular,

having small tubers. Fibrous, The thread-

(2.) SECONDARY, growing from stems. Underground, starting from stem below ground. Aerial, starting from stem above ground.

STEM.

Parts. _ Node, part to which the leaf is fastened.

i, Internode, portion between nodes.

a, Axil, the angle between leaf and stem, upper side.

Class. — Exogenous, outside-growing (Maple, Elm). Endogenous, inside-growing (Corn-stalk, Timothy).

Situation. — (1.) Above ground, usually leaf-bearing.
(2.) Under ground, scale-bearing.

Stems above Ground.

Character. — Herbaccous, soft, not woody (Four-o'clock). Suffrutescent, slightly shrubby (Toad-flax). Suffruticous, shrubby at base (Trailing Arbutus). Fruticous, shrubby (Currant-bushes). Arborescent, tree-like (Flowering Dogwood). Arborescent, tree (Elm).

Direction of Growth. — Repent, man prostrate and rooting from the under surface (Partridge-berry).

Procumbent, prostrate, but not rooting (Purslane).

Decumbent, prostrate, except at the extremity (Poor Man's Weather-glass).

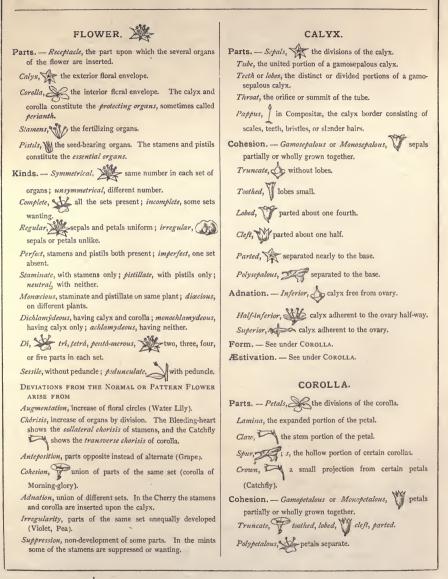
Assurgent, & ascending obliquely. Erect, upright (Indian Corn). Scandent. t. climbing with tendrils or rootlets (Grape, English Ivy) Voluble, twining (Morning-glory). Declinate, declined or bent downwards (Blackberry). Diffuse, loosely-spreading (Red Currant). Forms of Branches. - Sucker, y ra branch of subterranean origin that finally rises out of the ground. The Raspberry multiplies in this way. Offset, a short, prostrate-rooting branch with a tuft of leaves at the end (Houseleek), Runner, . . Sha long, prostrate-rooting branch with tuft of leaves (Strawberry), Stolon. a branch that curves downward and takes root. The Currant multiplies in this way. Tendril, that thread-like coiling branch used for climbing. a hard, sharp-pointed branch. Spine or Thorn, Stems under Ground. a perennial, hori-Kinds. - Rhizoma or Rootstock. zontal stem, partially or wholly subterranean (Calamus). Tuber, A an enlarged stem with eyes (White-potato). Bulb, a bud, usually subterranean with fleshy scales (Onion, Lily).

Corm, Torna a solid bulb (Indian Turnip).

Venation. - Parallel, with simple veins running LEAVES. parallel from base to apex. Parts. _____ b, Blade; the expanded portion. Feather, (IF) with lateral veins branching at regular interp, Petiole, the stem vals from midrib s, Stipules, leaf-like appendages at base of petiole. Radiate, with strong veins branching from apex of Kinds. - (1.) SIMPLE, (1) having but one blade. Reticulate, W with veins and veinlets that unite and Sessile, without petiole. separate in the form of network. Petiolate, We with petiole. Form. - (a.) BROADEST AT THE MIDDL'E. - Peltate, ; orbicular, (I), oval, (V); elliptical, (V); ob-Stipulate, with stipules. long, (; linear, ; acerose, () (Pine). Cirrhous, Seg with tendril. (b.) BROADEST AT BASE. - Deltoid, (; cvate (); A; subulate, A; cordate, A; renilanceolatc, (2.) COMPOUND, A having more than one blade. form, (1); hastate, K; sagittate, (a.) Pinnate, with leaflets arranged along a common (c.) BROADEST AT THE APEX. - Obovate, (1); oblanpetiole. ceolate. J: spatulate. D; cuneats D obcordate Abruptly pinnate, a with even number of leaflets. lyrate, F; runcinate, 300 Odd-pinnate, Khaving an odd leaflet. Bases .- Auriculate, 15; oblique, D; topering, D; abrupt, D; clasping, D; perfoliate, C; connate, Unipinnate, divided but once. ; decurren Bipinnate, Fred divided twice. Apexes. - Obcordate. ; emarginate, ; retuse, Tripinnate, divided three times. ; truncate, ; obtuse, ; acute, ; acumi-(b.) Palmate, Schefets diverging from one point. nate, A ; mucronate, (+); cuspidate, +; aris-Unipalmate, divided but once. Margins. - Entire, ; repand, ; sinuate, Bipalmate, divided twice. crenate, ; dentate, ; serrate ; incised, Tripalmate, divided three times. WANN ; laciniate, ANY; palmately-lobed, R; pal Framework. - Midrib, the central vein. mately-cleft, 2; palmately-parted, ; palmatelystrong veins branching from near Ribs, , KS divided, K; pinnately-lobod, K; pinnately-cleft, the base of midrib. B: pinnately-parted, S; pinnately-divided, Veins, the branching framework. Veinlets, W small veins.

б

Involucre, a cluster of bracts., Surface. - (a.) WITHOUT HAIRS. - Glabrous, smooth. (b.) SOFT HAIRS. - Pilous, few, short : hirsute, few, long : Kinds. - (1.) SOLITARY, single, alone. pubéscent, dense, short; villous, dense, long; sericeous, Terminal, at the summit of the stem. silky; lanuginous, woolly; toméntous, matted like felt; flóccous, fleecy tufts. I in the axils of the leaves. Axillary. (c.) STIFF HAIRS. - S. abrous, minute, hard points ; hispid, few, short points ; sētous, bristly ; spinous, having spines. (2.) CLUSTERED, several flowers collected in a bunch. Color. - Glaucous, covered with whitish powder. (a.) INDEFINITE or INDETERMINATE, flowcring from axil-Canéscent, grayish-white with fine pubescence. lary buds. Inflorescence centripetal. Incanous, hoary-white. Raceme, 11 flowers arranged Punctate, having transparent dots. Hyaline, nearly transparent. along the axis; pedicels about Texture. - Succulent, fleshy; coriaceous, leather-like; scariequal in length (Currant). ous, dry; rúgous, wrinkled. Córvmb. same as raceme. Phyllotaxis, arrangement on the stem. - Alternate, except that the lower pedicels are opposite, &; whorled (verticillate); radical, near clongated, making the top flat (Hawthorn). FLOWERS PEDICELLATE. the ground ; cauline, on the stem ; rosulate, of clus-Umbel, same as corymb, extered ; fasciculate, White in bundles. cept that the pedicels branch from Vernation, arrangement in the bud. about the same point (Milkweed). Induplicate, D folded crosswise (Tulip-tree). Panicle, compound raceme Conduplicate, / folded along midrib (Oak). (Blue-grass). Plicate, MMM) folded like a fan (Red-currant). Thyrsus, a compact panicle (Lilac). Circinate, O rolled lengthwise (Fern). Spike. 2 same as raceme with Convolute, (rolled edgewise (Cherry). flowers sessile (Mullein). Involute, O both edges rolled inward (Apple). Spādix. a fleshy spike, generally Revolute, (both edges rolled outward (Willow). enveloped by a large bract called Equitant, A astraddle (Iris). a Spathe, (Calla Lily). Obvolute, half equitant (Jerusalem Sage). FLOWERS SESSILE. Ament or Catkin, L Triquetrous, Triangular equitant (Sedges). a slender pendent spike, with scaly bracts Duration. - Fugacious, falling very early. (Birch). Deciduous, falling at the close of the season, Persistent, remaining through the winter. Head or Capitulum, a shortened spike, reduced to a globular form INFLORESCENCE. (Clover). (b.) DEFINITE or DETERMINATE, flowers all terminal. Parts. - Flower, the blossom. Inflorescence centrifugal. Cyme, W flat-topped or rounded inflorescence (Elder). I the stem of a solitary flower or the main Peduncle, Fascicle, a compact cyme (Sweet-William). stem of a flower-cluster. Glomerule, a cyme condensed into a head (Mint). a peduncle that grows from the ground. Scape, J Verticillaster, two opposite glomerules joined (Motherwort). Pedicel, p, the stem of each flower of a flower-cluster. Scorpioid, The , a one-sided and coiled cyme (Forget-me-Bracts, b, small floral leaves. not).



 Perkyment, We corolla attached to the calyx. It is the around the pistil (grain, pistil). Perkyment, We corolla attached to the calyx. It is the around the pistil. Form. — GANOPETALOUS and FOLVERTALOUS. RECULSE. RECULSE. Campbendate, Wetelshaped (Whords berry). Campbendate, Wetelshaped (Hare bel). Campbendate, Wetelshaped (Hare bel). Campbendate, Wetelshaped (Hare bel). Campbendate, Wetelshaped (Potato). IRECULSE. CAMOPETALOUS. CAMOPETALOUS. CAMOPETALOUS. FOLVERTALOUS. FO	Adnation. — Hy	opbgynous, Sign corolla attached under	Æstivation, the arrangement of the floral organs in the bud.
 Perfeguenzi, Corolla attached to the calyx. It is thus around the piall. Efgeguenzi, Corolla attached to the ovary. It is thus upon the ovary which is a part of the pisll. Form. — GANOFETALOUS and POLVEETALOUS. REDULAR. Campénulate, Colleshaped (Whorleberry). Tubular cylindrical (Trumpet Honeysuckle). Campénulate, Colleshaped (Harebell). Infundibular, Colleshaped (Harebell). Infundibular, Colleshaped (Potato). IRREGULAR. Calladite, Colleshaped (Potato). IRREGULAR. Calladite, Colleshaped (Dandbello, Personate, Colleshaped (Colleshaped (Colles	the pistil (gynia, pistil).		
 Form. — GANOPETALOUS FORM. — GANOPETALOUS and POLYPETALOUS. CRUCLAR. Campénulate, Weblehaped (Wortheber); Tubular cylindrical (Trumpet Honeysuckle). Campénulate, Weblehaped (Harebel), Infundibular, Weblehaped (Harebel), Infundibular, Weblehaped (Harebel), Infundibular, Weblehaped (Potato). Ratete, Weblehaped (Dandelion, Weblehaped, (Carmint). Ratete, Weblehaped (Potato). Rates with construct, Weblehaped (Potato). Rateter, Weblehaped (Potato). Rates with construct, Weblehaped (Potato). Rates with construct, Weblehaped (Potato). Rates with construct, Weblehaped (Potato). Rates with construct cosed (Toad-fax). Revertate. Revertate. Revertate. Constitute, Weblehaped (Lip). Carryshylithcoux, Inog claws enclosed in a tube (Pins). Parketetee, Personate, Weblehaped (Lip). Carryshylithcoux, Inog claws enclosed (Benn). Parketetee, Personate, Weblehaped (Lip). Carryshylithcoux, Inog claws enclosed (Benn). Parketetee, Personate, Weblehaped (Lip). Carryshylithcoux, Inog claws enclosed in a tube (Pins). Parketetee, Personate, Weblehaped, Pinsten, Weblehaped, Weblehap	Perigynous, corolla attached to the calyx. It is thus		
 POLYPETALOUS POLYPETALOUS<	around the pistil.		Induplicate, () margins turned inward (sepals of
 upon the ovary which is a part of the pistil. Form GAMOFETALOUS and POLYPETALOUS. REGULAR. GAMOFETALOUS. GAMOFETALOUS. GAMOFETALOUS. GAMOFETALOUS. REGULAR. Liguidate, with bell-shaped (Potato). IAREGULAR. Liguidate, with strap shaped (Dandelion). LAbiate, two lipped. Gdicate, with our server in the other inside. POLYPETALOUS. POLYPETALOUS.<th>Epigynous, 🖾</th><th>corolla attached to the ovary. It is thus</th><th>Clematis).</th>	Epigynous, 🖾	corolla attached to the ovary. It is thus	Clematis).
 CAMOPETALOUS POLYPETALOUS POLYPETALOUS<	(-)		Reduplicate, () margins turned outward (sepals of
Urceolate, urn-shaped (Whorlebry), Tubular cylindrical (Trumpet Honeysuckle), campénulate, bell-shaped (Harebel), Infundibular, funnel-shaped (Harebel), Hopeysuckle), funnel-shaped (Morning-glory), Hyperaterime/ryhous, salversing salversing shaped (Phox), Restate, salversing funnel-shaped Katate, wheel-shaped (Dandelion), katate, funnel, within and the remaining one kith one edge outside and the other inside. Ingenet, wheel-shaped (Dandelion), katate, funnel, within and the remaining one large petal enclosing the other (Pea). Resouras, wheel-shaped (Dandelion), katate, funnel, Witate, funnelistaped (Camint), Ringent, both lips archedlion, Supervolute, fill funnelistaped (Camint), Resouras, petals without claws gradual, Anther, the enlarged and essential portion. Fi	Form. — GAMOP	ETALOUS and POLYPETALOUS.	Hollyhock).
 berry, Tubular cylindrical (Trumpet Honeysuckle). Campénulate, bell-shaped (Harebell). Infundibular, funnel-shaped (Marebell). Infundibular, funnel-shaped (Marebell). Infundibular, funnel-shaped (Marebell). Infundibular, funnel-shaped (Marebell). Infundibular, funnel-shaped (Potato). IRREGULAR. Ligulate, for wheel-shaped (Dandelion). Catmint). Galleate, for wheel-shaped (Dandelion). Catmint). Ringent, for both lips arched (Dandelion). Ringent, for claved petals without clavs (Rose). Lilitecous, for petals with clavs gradual in a tube (Pink). Carupplyliteous, long clavs enclosed in a tube (Pink). Follypertalous. <li< th=""><th>1</th><th>Soll</th><th>Convolute, or contorted, () each piece overlaps its</th></li<>	1	Soll	Convolute, or contorted, () each piece overlaps its
 Tubular cylindrical (Trumpet Honeysuckle). Campénulate bell-shaped (Harebell). Infundibular, funnel-shaped (Harebell). Infundibular, funnel-shaped (Morning-glory). GAMOPETALOUS. GAMOPETALOUS. GAMOPETALOUS. Galatte, for wheel-shaped (Pottob). IRREGULAR. Ligulate, for strap-shaped (Dandelion). Läbiate, two lipped. Galatte, for upper lip arched (Catmint). Ringent, for both lips arched (Dead-netile). Personate, for throat .closed (Toad-flax). FREULAR. FREULAR. Reoutar. Lilitäcoux, for petals without claws gradually spreading (Lly). Carryphylitzeur, four clawed petalin a tube (Fink). FOLVYETALOUS. FOLVYETALOUS. FOLVYETALOUS. FOLVYETALOUS. FOLVYETALOUS. Follow, France, for a cross (Mustard). Resoutars. Papilionateons, for clawed petalin in the form of a cross (Mustard). Resoutars. Papilionateons, for a cross (Mustard). Resoutars. Papilionateons, for the form of a cross (Mustard). PARTS. – Verillum, tanner; ala, Policyferual, for with the cross esc. Parts. – Verillum, tanner; ala, Parts. – Verillum, tanner; ala, 			neighbor in one direction (Geranium).
 Campfanulate, we bell-shaped (Harebell). Campfanulate, we bell-shaped (Harebell). Infundibular, funnel-shaped (Morning-glory). GAMOPETALOUS. Reacter, we helshaped (Potato). IRREGULAR. Cigulater, we helshaped (Dandelion). Cathiart, we helshaped (Dandelion). Cathiart, we helshaped (Dandelion). Cathiart, we helshaped (Dandelion). Cathiart, we have hels a strap-shaped (Dandelion). Cathiart, we have helding of gamopétalous flowers. Supervolute, with folds turned obliquely in the same direction (Morning-glory). STAMENS (ANDRECIUM). Parts Weillam, baner; ale, we have holding the anther. Polvyperatous. Polvyperatous. Polvyperatous. Polvyperatous. Polvyperatous. Parts Vexillum, baner; ale, Parbinonteous, we have butterfly-shaped (Bean). Parts Vexillum, baner; ale, Parbinonteous, we have butterfly-shaped (Bean). Parts Vexillum, baner; ale, Parbinonteous, we have butterfly-shaped (Bean). Parts Vexillum, baner; ale, Parbinonteous, we have butterfly-shaped (Bean). Parts Vexillum, baner; ale, Parbinonteous, we have butterfly-shaped (Bean). Parts Vexillum, baner; ale, Parbinonteous, we have butterfly and the form of a cross (Mustard). Parts Vexillum, baner; ale, Parbinonteous, we have butterfly subter flaments into one set. Partadynamous, we have butterfly-shaped (Bean). Partadynamous we have but her flaments into one set. 			Imbricated, $\bigcirc \bigcirc$ one or more petals wholly outside.
 Campénulate bell-shaped (Harebell). Campénulate bell-shaped (Harebell). Infundibular, funnel-shaped (Morning-glory). CAMOPETALOUS. GAMOPETALOUS. GAMOPETALOUS. GAMOPETALOUS. GAMOPETALOUS. Retate, wheel-shaped (Potato). IRREGULAR. Ligulate, wheel-shaped (Dandelion). Lädbiate, two-lipped. Galeate, wheel-shaped (Dandelion). Cathinti. Ringent, wheel-shaped (Dandelion). Catadefax). Rescutar. Rescutar. Rescutar. Rescutar. Caudefax). Rescutar. Rescutar. Caudefax. Rescutar. Catifications, wheels without claws (Rose). Catifications, wheels without claws (Rose). Catifications, wheels are closed in a tube (Pink). Follyperatous. Follyperatous. Follyperatous. Follyperatous. Follyperatous. Follyperatous. Follyperatous. Follyperatous. Follyperatous. Follyperations. Follyperations. Follyperatous. <l< th=""><th></th><th>Honeysuckle).</th><th>Ouincúncial, () five petals, two without and two</th></l<>		Honeysuckle).	Ouincúncial, () five petals, two without and two
 Infundibular, funnel-shaped (Morning-glory). GAMOPETALOUS. GAMOPETALOUS. GAMOPETALOUS. Rotate, Wolipped. Ligulate, wolipped. Galeate, w			within and the remaining one with one edge outside
 (Morning-glory). Hyperaterimérphous, Salvershaped (Phlox). GAMOPETALOUS. GAMOPETALOUS. GAMOPETALOUS. GAMOPETALOUS. GALate, Wuhel-shaped (Potato). IRREGULAR. Ligulate, Strap shaped (Dandelion). Läbiate, two lipped. Gálcate, Wuhel-shaped (Dandelion). Läbiate, two lipped. Gálcate, Wuhel-shaped (Dandelion). Läbiate, two lipped. Gálcate, Wuhel-shaped (Dandelion). Läbiate, Wolfped. Galate, Wuhel-shaped (Dandelion). Läbiate, Wolfped. Galate, Wuhel-shaped (Dandelion). Läbiate, Wolfped. Galate, Wuhel-shaped (Dandelion). Ringent, Wolfped. Galate, Wuhel-shaped (Dandelion). Ringent, Wolfped. Galate, Wuhel-shaped (Dandelion). Regular. Regular. Regular. Regular. Regular. Polyperatious. <		Infundibular, funnel-shaped	(-)
 POLYPETALOUS. POLYPETALOUS. POLYPETALOUS. POLYPETALOUS. POLYPETALOUS. PATS Vexillum, baner; ale, PATS Vexillum, PATS Vexillum, PATS Vexillum, PATS Vexillum, PATS Vexillum, PA	-	(Morning-glory).	
 GAMOPETALOUS. RAdate, Wheel-shaped (Potato). IRREGULAR. Ligulate, Strap-shaped (Dandelion). Läbiate, two-lipped. Gäleate, Wuele-shaped (Dandelion). Läbiate, two-lipped. Gäleate, Wuele-shaped (Dandelion). Cationint). Ringent, Woolb ped. Galeater, Wuele-shaped (Dandelion). Ringent, Woolb ped. Galeater, Wuele-shaped (Dandelion). Galeater, Wuele-shaped (Dandelion). Cationint). Ringent, Woolb ped. Condentelo. Personate, Wuele-shaped throat -closed (Dead-nettle). Personate, Wuele-shaped throat -closed (Toad-flax). Regular. Regular. Petals without claws gradually spreading (Lily). Caryophyllätecous, Iong claws enclosed in a tube (Pink). Cruefferous, Wuele-shaped petals in the form of a cross (Mustard). IRREGULAR. Papilionätecous, Wuele-shaped petals in the form of a cross (Mustard). IRREGULAR. Papilionätecous, Wuele-shaped petals in the form of a cross (Mustard). IRREGULAR. Papilionätecous, Wuele-shaped petals in the form of a cross (Mustard). IRREGULAR. Papilionätecous, Wuele-shaped petals in the form of a cross (Mustard). IRREGULAR. Papilionätecous, Wuele-shaped petals in the form of a cross (Mustard). IRREGULAR. Parts Vexillum, banner;			
 POLYPETALOUS POLYPETALOUS POLYPETALOUS POLYPETALOUS PATS Vexillum, baner; ale, Parts Supervolute, and the anther. Pricate, and the polyment of the same direction (Morning-glory). Plicate, and the same direction (Morning-glory). STAMENS (ANDRECIUM). Parts Anther, the enlarged and essential portion. Filament, the same direction (Morning-glory). STAMENS (ANDRECIUM). Parts Anther, the enlarged and essential portion. Filament, the same direction (Morning-glory). STAMENS (ANDRECIUM). Parts Anther, the enlarged and essential portion. Filament, the stem holding the anther. Polen, the fertilizing powder found in the anther. Kinds Sessile, and anther without falament. Sterile, filament without anther. Converging. Exserted, and the corolla. Didynamous, four in number, two long and two short. Cohesion Syngenesious, and the into one set. Didynamous, and the into one set. 		N	Véxillary, (()) having one large petal enclosing the
 Ligulate, strap-shaped (Dandelion). Läbiate, two-lipped. Găleate, so upper lip arched (Catmint). Ringent, so both lips arched (Dandelion). Găleate, so upper lip arched (Catmint). Ringent, so both lips arched (Dead-nettle). Personate, so petals without clavs (Rose). Liliäccous, so petals with clavs grading (Lily). Caryophylliceous, long claws enclosed in a tube (Pink). POLYPETALOUS. <l< th=""><th>GAMOPETALOUS.</th><th>Rotate, W wheel-shaped (Potato).</th><th></th></l<>	GAMOPETALOUS.	Rotate, W wheel-shaped (Potato).	
 Iion). <i>Läbiate</i>, two-lipped. <i>Găleate</i>, with folds turned obliquely in the same direction (Morning-glory). <i>Găleate</i>, with folds turned obliquely in the same direction (Morning-glory). <i>Găleate</i>, with folds turned obliquely in the same direction (Morning-glory). <i>STAMENS</i> (ANDRECIUM). <i>Parts. — Mather</i>, the enlarged and essential portion. <i>Filament</i>, the stem holding the anther. <i>Polen</i>, the fertilizing powder found in the anther. <i>Resourae</i>, petals without claws gradually spreading (Lily). <i>Carrophylitecous</i>, petals with claws gradual usly spreading (Lily). <i>Carrophylitecous</i>, four clawed petals in the form of a cross (Mustard). <i>PolyPeTALOUS.</i> <i>Parts. — Vexillum, banner; alæ,</i> <i>Parts. — Vexillum, banner; alæ,</i> <i>Parts. — Vexillum, banner; alæ,</i> 		IRREGULAR.	Plicate, K the folding of gamopétalous flowers.
Galeate, upper lip arched (Catmint). STAMENS (ANDRECIUM). Ringent, both lips arched (Dead-nettle). Anther, the enlarged and essential portion. Personate, throat .closed (Toad-flax). Anther, the enlarged and essential portion. REGULAR. Frestonate, anther without flament. Rosee. petals without claws (Rose). petals without claws (Rose). anther without flament. Lilifaceus, (Rose). petals with claws grad- ually spreading (Lily). converging. anther without flament. Caryophyllateous, (In a tube (Pink). four clawed petals in the form of a cross (Mustard). four clawed petals in the form of a cross (Mustard). four clawed petals in the form of a cross (Mustard). IRREGULAR. Papilionateous, (Bean). butterfly-shaped (Manther, be anthers, conseine. four in number, four long and two short. Cohesion. Syngenesticus, Monodelphous, united by their filaments into one set. united by their anthers.			Supervolute, Red with folds turned obliquely in the
(Catmint). Ringent, we both lips arched (Dead-nettle). STAMENS (ANDRECIUM). Personate, we both lips arched (Dead-nettle). Parts. — Anther, the enlarged and essential portion. Presonate, we both lips arched (Toad-flax). Farts. — Manther, the enlarged and essential portion. Regular. Regular. Regular. Personate, we both lips arched (Toad-flax). Regular. Personate, we beals without claws grad ually spreading (Lily). Carroefylylifecous, long claws enclosed in a tube (Pink). Four clawed petals in the form of a cross (Mustard). IRREGULAR. Fourtiferous, four clawed petals in the form of a cross (Mustard). IRREGULAR. Four long and two short. PARTS. – Vexillum, banner; alæ, Partis. – Vexillum, banner; alæ, Mandelphous, united by their filaments into one set.		Lābiate, two-lipped.	
(Catmint). Ringent, we both lips arched (Dead-nettle). STAMENS (ANDRECIUM). Personate, we both lips arched (Dead-nettle). Parts. — Anther, the enlarged and essential portion. Presonate, we both lips arched (Toad-flax). Farts. — Manther, the enlarged and essential portion. Regular. Regular. Regular. Personate, we both lips arched (Toad-flax). Regular. Personate, we beals without claws grad ually spreading (Lily). Carroefylylifecous, long claws enclosed in a tube (Pink). Four clawed petals in the form of a cross (Mustard). IRREGULAR. Fourtiferous, four clawed petals in the form of a cross (Mustard). IRREGULAR. Four long and two short. PARTS. – Vexillum, banner; alæ, Partis. – Vexillum, banner; alæ, Mandelphous, united by their filaments into one set.		Galeate, he upper lip arched	
(Dead-nettle). Personate, Image: Personate, <		ler .	STAMENS (Andrecium).
Personate, Filtement, the steril noting the anther. Personate, Filtement, the steril noting the anther. Pollen, the fertilizing powder found in the anther. (Toad-flax). Regular. Regular. Rode, the fertilizing powder found in the anther. Kinds. — Sessile, Regular.		Ringent, both lips arched	Parts Anther, the enlarged and essential portion.
(Toad-flax). Kinds Sessile, mail anther without filament. REGULAR. Rose petals without claws (Rose). petals without claws converging. Liliaccous, metals without claws petals with claws gradually spreading (Lily). converging. Caryophyllaccous, long claws enclosed in a tube (Pink). four clawed petals four clawed petals POLYPETALOUS. Cructferous, four clawed petals four clawed petals In the form of a cross (Mustard). IRREGULAR. papilionaccous, four butterfly-shaped (Bean). pARTS Vexillum, banner; alæ, butterfly-shaped			
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(Bean). PARTS. – Vexillum, banner; alæ, Diadelphous, united by their filaments into one set. Diadelphous, united into two sets.			
PARTS Vexillum, banner; alæ, Diadelphous, united into two sets.			

Adnation. — Hypógynous, Ster borne on the receptacle. Perígynous, Ster borne on the calyx. Epipitalous, borne on the corolla. Alternate, Staternate with the lobes. Opposite, in front of the lobes. Epigynous, borne on the ovary at its summit.

Gynándrous, borne on the style (Orchid).

FILAMENT.

Kinds. - Filiform, subulate, dilated, petaloid, bidentate.

ANTHER.

Parts. - Lobes (thecæ) and connective.

Adnation. — Innate, anther firm on summit of filament.

Adnate, Annate, anther attached by its whole length to filament. Extrôrse, facing the petals. Intrôrse, facing the pistils.

Versatile, A attached near the middle.

Dehiscence. - Longitudinal, No opening lengthwise.

Transverse, 7 opening crosswise.

Porous, no opening by terminal holes.

Valved, opening by valves or doors.

PISTILS (GYNŒCIUM).

Parts. - $\bigvee_{\bigcirc} \stackrel{I}{\Rightarrow} Stigma$, the rough end to which the pollen adheres.

Style, the stem holding the stigma.

Ovary, the enlarged portion containing the ovules.

Cohesion. — Simple, J J having but one cell, placenta style and stigma.

Multiple, a collection of simple pistils (Blackberry).

Compound, simple pistils grown together, each called a carpel.

STIGMA.

Kinds. — Sessile, stigma on ovary; no style.
 Globose, globular (Four-o'clock).
 Capitate, broad and flat.
 Lobed, rounded.
 Feathered, like a feather (Grasses).
 Linear, thread-like (Corn).

STYLE.

Kinds. — Basal, attached to base of ovary (Forget-me-not). Lateral, attached to side of ovary (Strawberry).

Terminal, $\delta = \delta$ attached to top of ovary.

OVARY.

Parts. — Placentæ, the parts to which the ovules are attached.

Dissepiments, partitions.

Cells, cavities in which the ovules are arranged. *Ovules*, unfertilized seeds.

Adnation. — Inferior, A calyx adherent to ovary, same as superior calyx.

Superior, Calyx free from ovary, same as inferior calyx.

Placentation. - Free-central, (ovules attached to a central column in a one-celled ovary (Pink).

Axillary, () ovules attached to a central column in a compound ovary.

Parietal,) ovules attached to the outer walls of the ovary.

OVULE.

Parts. — Nucleus, n, the essential part in which the embryo is formed.

Primine, p, the exterior coat.

Secundine, s, the interior coat.

Micropyle, m, the opening of the ovary coats.

Funículus, the stem to which the ovule is attached.

Hilum, h, the point of attachment on the ovule.

Chalāza, c, the place where the coverings and nucleus join.

Rhāphe, r, the connection between the hilum and the chalaza.
N. B. — Through the funiculus, the rhaphe, and the chalaza the ovule receives its nourishment from the placenta. Through the micropyle it receives the tubular prolongation of the pollen.

Kinds. — Orthótropous, Straight; no change in direction of parts (Buckwheat).

Campylótropous, , curved; the micropyle brought near the chalaza (Bean).

Anátropous, , inverted; the micropyle brought near the hilum, pointing to the placentæ. Rhaphe the whole length of the ovule (Magnolia).

Amphitropous, A half inverted; short rhaphe (Mallow).

Direction of Ovary. — Erect, (); ascending, ?; horizontal, (); pendulous,); suspended, ().

FRUIT.

Parts. - Seed, the part containing the embryo.

Pericarp, the covering of the seeds, including the ovary and all adnate parts. The parts of the pericarp are epicarp, or outer coat; mesocarp, or middle coat; and endocarp, or inner coat.

Dehiscence. - Septicidal, Solopening of the partitions.

Loculicidal, (, , o pening at the dorsal suture.

Septifragal, (*)(-*) valves falling away from partitions.

Circumcissile, opening by a circular horizontal line.

- Kinds. Simple, aggregate, accessory, multiple.
 - SIMPLE FRUITS. Fleshy, Stone, Dry (formed by a single pistil).
 - (a.) FLESHY FRUITS. Indehiscent (with two or more seeds).

Seeds immersed in Berry, rind membranous (Grape). Hesperidium, rind leathery, separable

a pulpy mass. (Orange).

Pēpo, rind hard (Cucumber).

Seeds in cells. - Pome, succulent calyx (Apple).

(b.) STONE FRUITS. — Indehiscent; one-celled; endocarp hard.

Drupe, three-coated; stone-cell entire (Peach).

Tryma, two-coated; stone-cell two-parted (Walnut). Etario, an aggregation of drupes (Raspberry).

- (c.) DRY FRUITS. Indehiscent, usually one seed with one coat. Achenium, | coat separable from seed (Dandelion). Utricle, coat inflated (Goosefoot), Caryópsis, coat inseparable (Wheat). Glans, invested with a cupule. (Acorn). Samāra, having winged appendages (Maple). (c¹.) DRY FRUITS. - Dehiscent. Follicle, opening by a ventral suture (Columbine). Legume, opening by both su-Single pistil. tures (Bean). Loment, 2 jointed legume (Desmodium). Capsule, any compound dehiscent fruit. Silique. a two-valved capsule Compound pistil. (Mustard). Silicle, Va short silique (Shepherd's Purse). Pyxis, 🙇 circumscissile dehiscence (Purslane).
- (2.) AGGREGATE FRUITS, A cluster of carpels on one receptacle taken as a whole (Raspberry).
- (3.) ACCESSORY or ANTHOCARPOUS FRUITS. Those of which the most conspicuous portion, although appearing like a pericarp in some cases, does not belong to the pistil (Rose-hip).
- (4.) MULTIPLE or COLLECTIVE FRUITS. Those which result from the aggregation of several flowers into one mass (Pine-apple, Mulberry).

Strbbile or Cone, a scaly multiple fruit, resulting from the ripening of some kinds of catkins (Hop, Conifers).

Gálbalus, a closed cone (Juniper-berry, Red Cedar).

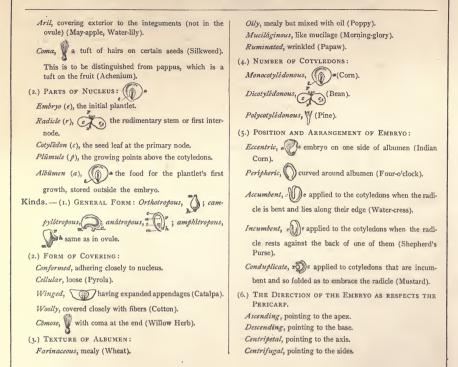


- Parts. Integuments, seed-coats. Nucleus, part containing the embryo.
 - (1.) PARTS OF INTEGUMENTS:

Testa (episperm), the outer or proper seed-coat.

Tegmen (endbpleura), the inner coat, sometimes wanting. Funículus Hilum (h), Chalāza (c), Rhāphe (r), are the same as in ovule.

II



(Specimen Page.)

Root	Multiple, fibrous.
Stem 2	Herb, erect, branching, 4', glabrous.
Leaves	Sessile, indistinct, ol long to spatulate, acute, entire, glabrous, opposite, 3" to 5" long.
Flowers	Solitary, terminal, slender peduncle, perfect, 5".
Calyx 5	Green, cleft, half-inferior cup.
Sepals	4, pointed, valvate.
Corolla	Light-blue with yellow eye, cleft, perigynous, salver.
Petals	4, oval, pointed, valvate.
Stamens 9	4, sessile, free, epipetalous, alternate.
Anthers	Oblong, 2, longitudinal
Pistil	1, compound, style 1.
stigma	2, oblong, lateral.
ovary	2, half-superior, axillary.
Fruit	Loculicidal, pod notched at apex.
Seeds 15	Several in each cell, saucer-shaped.

Remarks.-- In some plants the style is exserted and the stamens included, in others the style is included and the stamens exserted. They grow in tufts.

Class. - Exogenous.

DIVISION. - Monopetalous.

ORDER. - Rubiaceæ.

Name. SCIENTIFIC. — Houstonia cærulea. COMMON. — Common Houstonia or Bluets.

Locality. - Moist meadows, Trenton, N. J.

Date. - May 13th, 1870.

Root. - Kind.

Stem. - Class, character, direction of growth, height

Leaves. - Arrangement, kind, form, margin.

Inflorescence. — Arrangement, kind. Calyx.— Color, form, cohesion, adnation. Sepals.— Number, form, astivation. Corolla.— Color, form, cohesion, adnation.

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Fruit. - Dehiscence, kind.
Seeds. - Number, kind.

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